DIVISION OF MINES AND GEOLOGY
JAMES F. DAVIS, STATE GEOLOGIST

STATE OF CALIFORNIA - GRAY DAVIS GOVERNOR
THE RESOURCES AGENCY - MARY NICHOLS, SECRETARY FOR RESOURCES
DEPARTMENT OF CONSERVATION - DARRYL YOUNG, DIRECTOR

Prepared in cooperation with the U.S. Geological Survey

USGS science for a changing world

GEOLOGIC MAP OF THE PECHANGA 7.5' QUADRANGLE SAN DIEGO AND RIVERSIDE COUNTIES, CALIFORNIA: A DIGITAL DATABASE

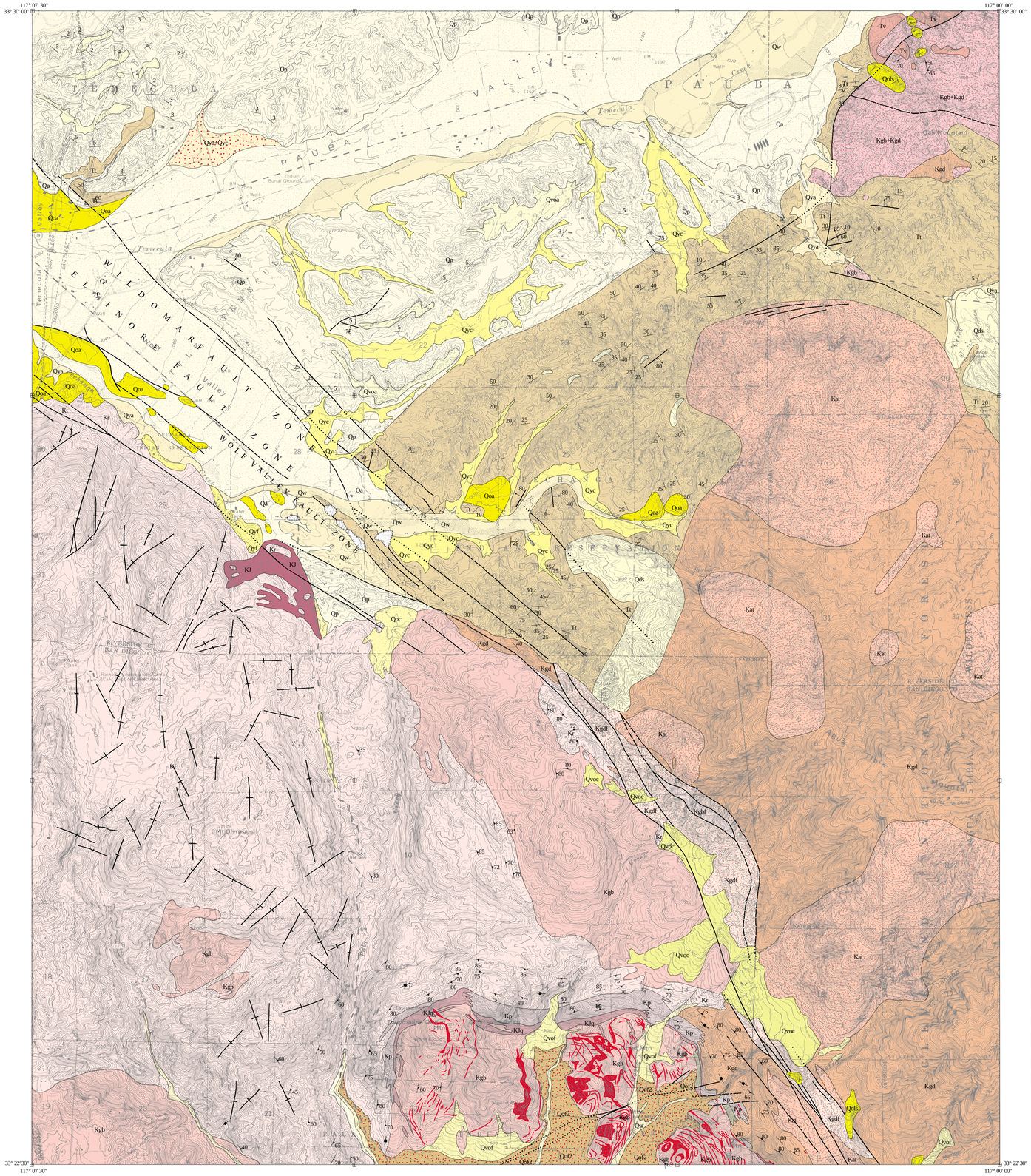
VERSION 1.0

By
Michael P. Kennedy[1]

Digital Database
by
Brad L. Nelson[2] and Rachel M. Hauser[2]
2000

1. California Division of Mines and Geology, Los Angeles, CA
2. U. S. Geological Survey, Riverside, CA

DEPARTMENT OF CONSERVATION
Division of Mines and Geology



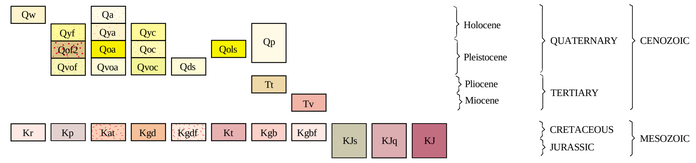
Topographic base by U.S. Geological Survey
7.5' Pechanga Quadrangle
Polyconic projection, contour interval 20 feet,
dotted lines 10 feet.

UTM GRID AND 1980 MAGNETIC NORTH
DECLINATION AT CENTER OF SHEET

SCALE 1:24000

This geologic map was funded in part by the U.S. Geological Survey National Cooperative Geologic Mapping Program, STATEMAP Award no. 99HQAG0134.

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

MODERN SURFICIAL DEPOSITS - Sediment that has been recently transported and deposited in channels and washes, on surfaces of alluvial fans and alluvial plains, and on hillslopes and in artificial fills. Soil-profile development is non-existant. Includes:

Qw Active channel and wash deposits (late Holocene) - Unconsolidated to locally poorly unconsolidated sand and gravel deposits in active washes of streams.

Qa Active alluvial flood plain deposits (late Holocene) - Unconsolidated to locally poorly unconsolidated sand and gravel deposits in active alluvial flood plains.

YOUNG SURFICIAL DEPOSITS - Sedimentary units that are slightly consolidated to cemented and slightly to moderately dissected. Alluvial fan deposits typically have high coarse:fine clast ratios. Younger surficial units have upper surfaces that are capped by slight to moderately developed pedogenic-soil profiles. Includes:

Qya Young alluvial flood plain deposits (Holocene and late Pleistocene) - Mostly poorly consolidated, poorly sorted, permeable flood plain deposits.

Qyc Young colluvial deposits (Holocene and late Pleistcene) - Mostly poorly consolidated and poorly sorted slope wash and stream deposits.

Qyf Young alluvial fan deposists (Holocene and late Pleistocene) - Mostly poorly consolidated and very poorly sorted sand, gravel, cobble and boulder deposits in young alluvial fans.

OLD SURFICIAL DEPOSITS - Sediments that are moderately consolidated and slightly to moderately dissected. Older surficial deposits have upper surfaces that are capped by moderate to well-developed pedogenic soils. Includes:

Qoa Older alluvial flood plain deposits (Pleistocene, younger than 500,000 years) - Mostly moderately well consolidated, poorly sorted, permeable flood plain depostits.

Qoc Older colluvial deposits (Pleistocene, younger than 500,000 years) - Mostly moderately well consolidated, poorly sorted slope wash and stream deposits.

Qpf2 Older fan deposits (Pleistocene, younger than 500,000 years) - Mostly poorly consolidated fan, debris flow and talus deposits. Clasts possess a moderately well developed clay coating but are otherwise fresh.

Qols Older landslide deposits (Pleistocene, younger than 500,000 years) - Landslide slump and rock fall depostits.

VERY OLD SURFICIAL UNITS - Sediments that are slightly to well consolidated to indurated, and moderately to well dissected. Upper surfaces are capped by moderate to well-developed pedogenic soils. Includes:

Qvoa Very old alluvial flood plain deposits (early Pleistocene) - Mostly well-indurated, poorly sorted, semi-permeable clay and sand flood plain deposits.

Qvoc Very old colluvial deposits (early Pleistocene) - Mostly well-indurated, poorly sorted, hillslope, clay and sand colluvial deposits.

Qvof Very old alluvial fan deposits (early Pleistocene) - Mostly very well-indurated, reddish-brown, sand and cobble, early Pleistocene aluvial fan deposits.

Qp Pauba Formation (early Pleistocene) - Light-brown moderately well-indurated, extensively crossbedded, channeled and filled sandstone and siltstone that contains occassional intervening cobble-and -boulder conglomerate beds.

Qds Dripping Springs Formation (early Pleistocene) - Pebble, cobble and boulder fanglomerate in a reddish-brown, poorly consolidated, poorly sorted sandstone matrix.

BEDROCK UNITS

Tt Temecula Arkose (Pleistocene) - Pale greenish-yellow, well-indurated, medium- and coarse-grained sandstone with thin interstratified beds of fine-grained, tuffaceous sandstone, siltstone, and claystone. Pebble and cobble conglomerate interbeds composed of locally derived basement rock clasts are also common and range in thickness from a few centimeters to a meter or more.

Tv Basalt (Miocene) - Dark-gray and black, fine-grained basalt.

Kr Granodiorite of Rainbow (Cretaceous) - Leucocratic hornblende-biotite granodiorite; medium- to coarse-grained, massive.

Kp Granodiorite of Pala (Cretaceous) - Leucocratic granodiorite and migmatite; fine- to medium-grained.

Kat Gabbro of Agua Tibia Mountain (Cretaceous) - Hornblende gabbro; medium- to coarse-grained, massive to foliate. This gabbro often contains minor biotite and quartz (quartz bearing gabbro).

Kgd Granodiorite undivided (Cretaceous) - Mostly hornblende-biotite granodiorite; medium- to coarse-grained.

Kgdf Granodiorite undivided fault part (Cretaceous) - Leucocratic hornblende-biotite granodiorite that has been extensively sheared along the Elsinore fault zone.

Kt Tonalite undivided (Cretaceous) - Mainly hornblende-biotite tonalite; coarse-grained, light gray.

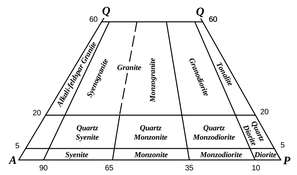
Kgb Gabbro undivided (Cretaceous) - Mosltybiotite-hornblende-hypersthene gabbro; coarse-grained, dark gray, massive.

Kgbf Gabbro undivided fault part (Cretaceous) - Mosltybiotite-hornblende-hypersthene gabbro that has been extensively sheared along the Elsinore fault zone.

KJq Quartzite and quartz conglomerate (Cretaceous and Jurassic) - Mostly quartzite, quartz conglomerate and meta-arkose.

KJs Schist with minor amphibolite and marble (Cretaceous and Jurassic) - Mostly quartz-mica-schist, quartz-mica amphibole schist, and feldspathic amphibole schist.

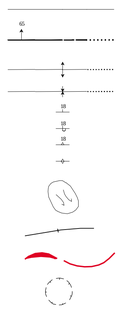
KJ Metavolcanic and metasedimentary rocks undivided (Cretaceous and Jurassic) - Low grade (greenschist facies) rocks that are in part coeval with and in part older than the Cretaceous plutonic rocks they lie in contact with.



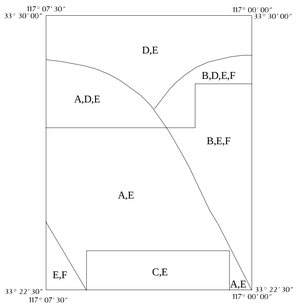
Classification of plutonic rock types (from IUGA, 1973, and *Streckeisen, 1973). A, alkali feldspar; P, plagioclase feldspar; Q, quartz.

*Streckeisen, A.L., 1973, Plutonic rocks--Classification and nomenclature recommended by the IUGA Subcommission on Systematics of Igneous Rocks: Geotimes, vol.18, pp.26-30.

MAP SYMBOLS



REFERENCES



A. Hanley, J.B. and Janhs, R.H., 1950 unpublished geological maps of the Pala and Rincon pegmatite districts, San Diego County, California: Unpublished U.S. Geological Survey mapping (scale 1:24,000). This mapping was used with slight modification for the basement rock geology throughout the central portion of the quadrangle.

B. Irwin, W.P. and Greene, R.C., 1970, Studies related to wilderness primitive areas, Agua Tibia, California: U.S. Geological Survey Bulletin 1319-A, 19 p., map scale 1:48,000. This mapping was used with slight modification for the basement rock geology in the east-central part of the quadrangle.

C. Jahns, R.H., and Wright, L.A., 1951, Gem- and lithium-bearing pegmatites of the Pala district, San Diego County, California: California Division of Mines and Geology Special Report 7-A, 72 p., map scale 1:18,000. This mapping was used with slight modification for the pegmatites and adjacent bedrock geology in the Pala gem district.

D. Kennedy, M.P., 1977, Recency and character of faulting along the Elsinore fault zone in southern Riverside County, California: California Division of Mines and Geology Special Report 131, 12 p., map scale 1:24,000. This mapping was used with slight modification for the northern half of the quadrangle.

E. Kennedy, M.P., 2000, New 1:24,000-scale geologic mapping completed between July 1999, and June 2000.

F. Larsen, E.S. Jr., 1948, Batholith and associated rocks of Corona, Elsinore and San Luis Rey quadrangles, southern California: Geological Society of America Memoir 29, 182 p., scale 1:125,000. This mapping was useful in depicting regional contacts between major plutons but the very small scale does not allow direct use of these contacts at 1:24,000.